

Final Environmental Assessment

Pago Pago Village Flood Project

Territorial Emergency Management Coordinating Office

PDMC-PJ-09-AS-2003-004

November 2004



FEMA

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Contract No. EMW-2000-CO-0247
Task Order 229

15296376.00400

FINAL ENVIRONMENTAL ASSESSMENT

FOR

**PAGO PAGO VILLAGE FLOOD HAZARD MITIGATION
PAGO PAGO, AMERICAN SAMOA
(PDMC-PJ-09-CA-2003-004)**

**Prepared for
Federal Emergency Management Agency**

**Prepared by
URS Corporation, Inc.**

November 2004

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ASCMP	American Samoa Coastal Management Program
ASDOC	American Samoa Department of Commerce
ASEPA	American Samoa Environmental Protection Agency
ASHPO	American Samoa Historic Preservation Officer
BMPs	Best Management Practices
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
EA	Environmental Assessment
EO	Executive Order
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
g	gravitational force
LOMR	Letter of Map Revision
NAAQSs	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
PDM	Pre-Disaster Mitigation
PM ₁₀	particulate matter less than 10 micrometers in diameter
TEMCO	American Samoa Territorial Emergency Management Coordinating Office
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency

The American Samoa Territorial Emergency Management Coordinating Office (TEMCO) has applied to the Federal Emergency Management Agency (FEMA) for funding under the Pre-Disaster Mitigation (PDM) Program to complete a flood control project. The PDM Program was authorized by Section 203 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), Title 42 of the United States Code Part 5133, as amended by Section 102 of the Disaster Mitigation Act of 2000 (Public Law 106-390, 114 Statutes 1552), to assist states/territories and communities to implement sustained, pre-disaster, natural-hazard mitigation programs to reduce overall risk to the population and structures, while also reducing reliance on funding from actual disaster declarations.

FEMA has prepared this Environmental Assessment (EA) to evaluate the impacts of the PDM Program project. The EA has been prepared according to the requirements of the National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality (CEQ) regulations implementing NEPA (Title 40 of the Code of Federal Regulations [CFR] Parts 1500–1508), and FEMA’s implementing regulations (44 CFR Part 10).

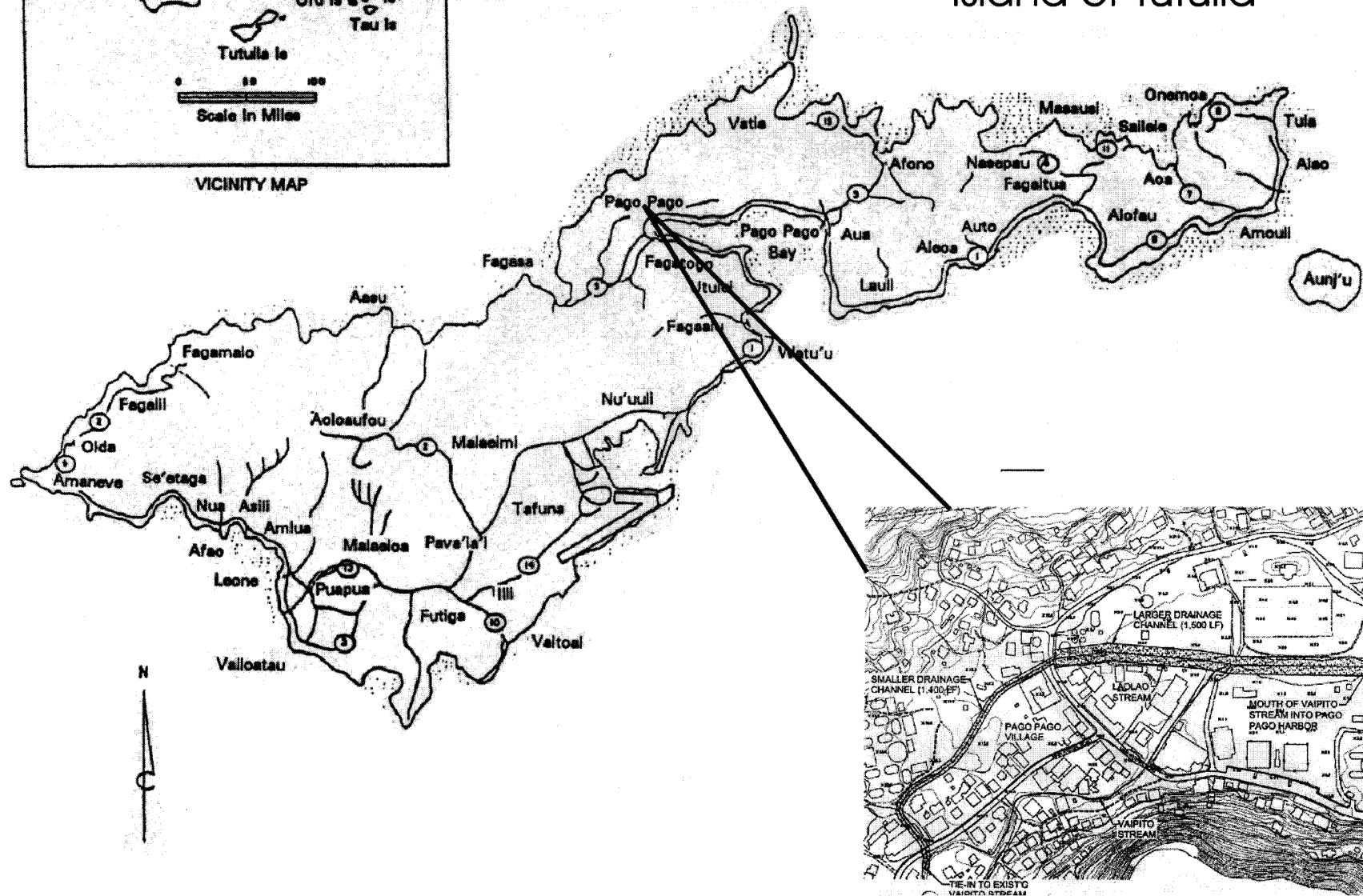
The EA process provides steps and procedures to evaluate the potential environmental, social, and economic impacts of a Proposed Action and alternatives as well as an opportunity for the public and local, state/territorial, and other federal agencies to provide input and/or comment through scoping studies and a public comment period. These potential impacts are measured by their context and intensity, as defined in the CEQ regulations.

The PDM Program assists states/territories and communities to implement sustained, pre-disaster, natural-hazard mitigation programs to reduce overall risk to the population and structures, while also reducing reliance on funding from actual disaster declarations. Therefore, the purpose of the action is to provide PDM Program funding to TEMCO.

Pago Pago Village is located on the island of Tutuila, American Samoa (Figure 1). During the Presidentially declared disaster of May 2003, overbank flooding of Vaipito Stream in Pago Pago Village caused considerable damage to roads and private and commercial properties. The main arterial road that connects the east and west sides of the island was blocked for two days. Access to major government, communication, police, firefighting, and other emergency services facilities and to the only hospital on the island was blocked for east-side residents until the road was cleared. Schools and a power generation plant are at risk of flooding.

TEMCO has identified the need to reduce the flood hazard on Vaipito Stream as one of its highest priorities. By reducing this flood hazards, interruptions for emergency operations during heavy rainfalls, thunderstorms, tropical storms, or hurricanes would be minimized. Therefore, action is needed to reduce the flood hazard of Vaipito Stream in Pago Pago Village.

Island of Tutuila



TEMCO evaluated several alternatives for reducing flooding in Pago Pago Village due to the overflow of Vaipito Stream.

3.1 ALTERNATIVES NOT CARRIED FORWARD

TEMCO considered relocating threatened facilities or rerouting Vaipito Stream to reduce the threat of property damage and threats to public health and safety caused by the inundation of portions of Pago Pago Village and roadways by floodwaters of Vaipito Stream. However, due to topographic and economic constraints, neither of these alternatives was considered feasible.

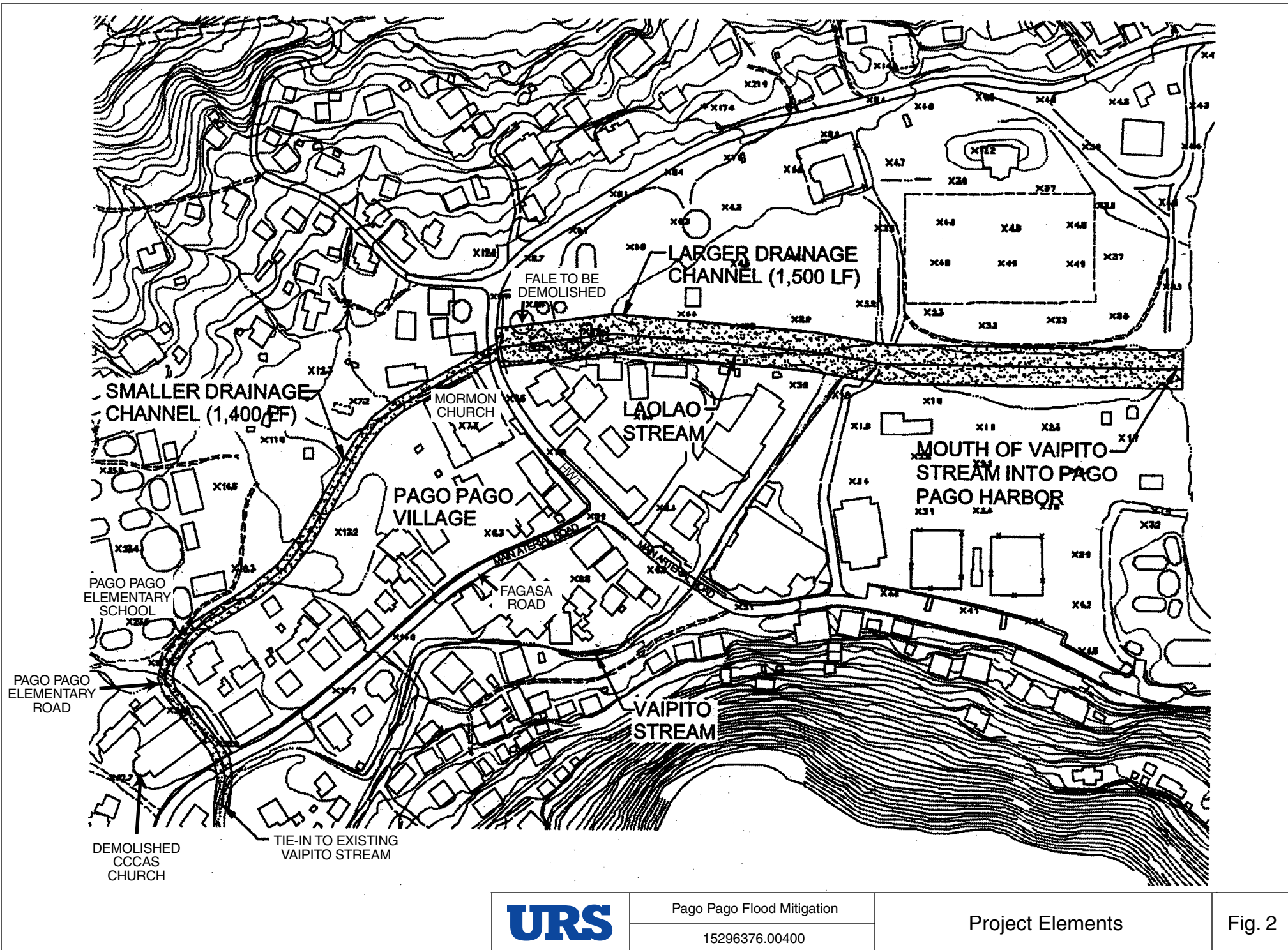
3.2 ALTERNATIVES CARRIED FORWARD

3.2.1 Alternative 1: No Action

Inclusion of a No Action Alternative in the environmental analysis and documentation is required under NEPA. The No Action Alternative is defined as maintaining the status quo with no FEMA funding for any alternative action. The No Action Alternative is used to evaluate the effects of not providing eligible assistance for the project, thus providing a benchmark against which “action alternatives” may be evaluated. For the purpose of this alternative, it is assumed that TEMCO would be unable to implement the Proposed Action for lack of federal assistance, and a flood hazard would remain unmitigated at the project site. Economic losses from flood damage would occur on a periodic basis. Adverse environmental, health, and safety effects resulting from flooding would not be mitigated.

3.2.2 Alternative 2: Proposed Action

The Proposed Action would consist of the construction of approximately 2,900 linear feet of improved and realigned channel designed to contain the 100-year flood (a flood event that has a 1-percent chance of occurrence within a given year) (Figure 2). The improved channel would reroute flows from Vaipito Stream into Laolao Stream, intercept flows from smaller tributary channels, and intercept sheet flow from surrounding mountain slopes. The alignment of the upstream portion of the improved channel would start at Vaipito Stream and proceed approximately 1,400 linear feet to the main arterial road (Highway 1), which connects the east and west sides of Tutuila. The new alignment of the upstream improved channel section would cross Fagasa Road and a portion of the demolished CCCAS (Catholic) church lot and proceed along Pago Pago Elementary School Road. The new alignment would turn in front of Pago Pago Elementary School, follow the existing alignment of Laolao Stream, and continue through a dense vegetated area and past the Mormon church before meeting Highway 1 at an existing bridge. This upstream improved channel section would then merge into a larger improved channel section on the harbor side of Highway 1. The length of the larger improved channel from Highway 1 to the stream mouth in Pago Pago Harbor would be approximately 1,500 linear feet. Two *fales* (open-air structures used for village meetings) would be demolished and rebuilt outside of the Proposed Action’s footprint in currently unoccupied property. The new channel sections would cross two main roads and one access road: Highway 1, Fagasa Road, and Pago Pago Elementary School Road.

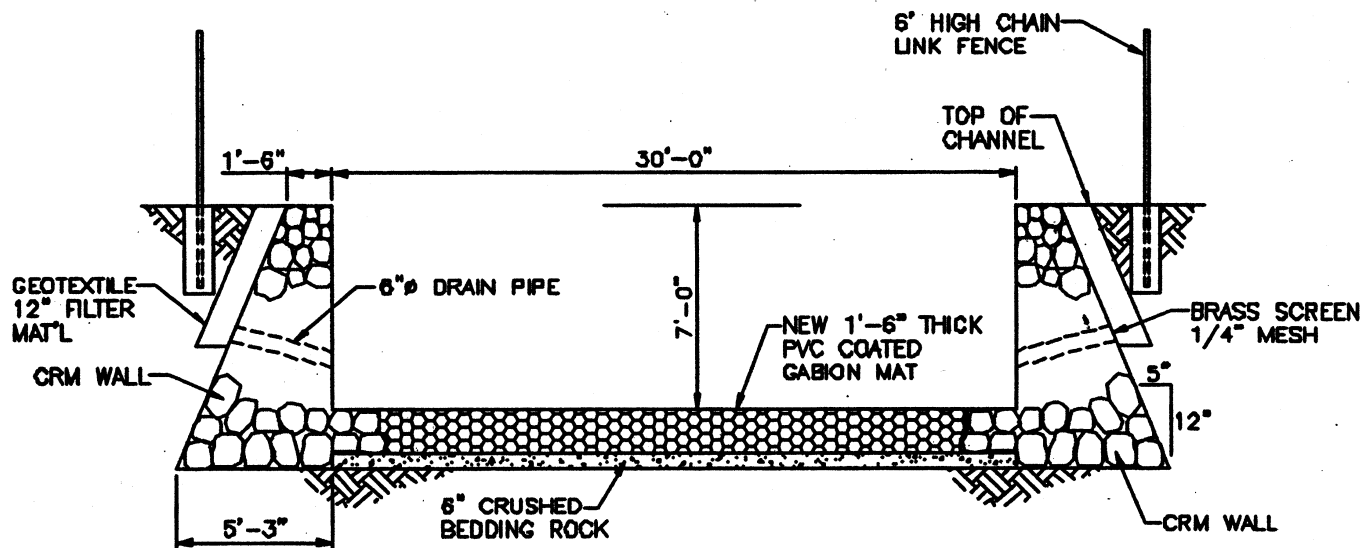


The Proposed Action would consist of the following components:

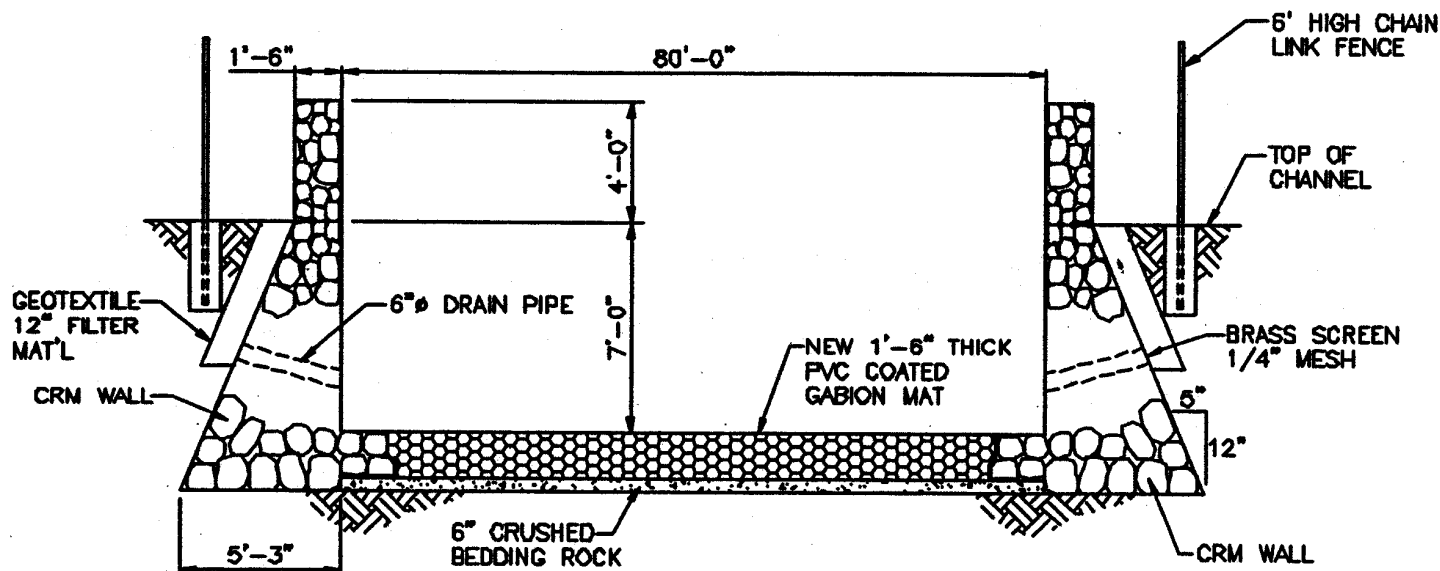
1. Demolition and clearing along approximately 2,900 linear feet of existing stream, including removal of trees, shrubs, debris, and rocks
2. Excavation, embankment shaping, and forming the channel for the construction of retaining walls and gabion stream bottom sections
3. Excavation and removal of approximately 28,000 cubic yards of material to construct the smaller upstream channel section and approximately 10,000 cubic yards of material to construct the larger downstream channel section
4. Dredging of an existing portion of Vaipito Stream near its mouth at Pago Pago Harbor
5. Construction of two road bridges, potential re-construction of the Highway 1 bridge
6. Construction of chain-link fencing for pedestrian safety along 2,900 linear feet of the improved drainage channel
7. Construction of a 4-foot-high floodwall on the larger downstream section of the improved drainage channel

The channel of the smaller, upstream alignment would be approximately 30 feet wide and 7 feet deep, with a 6-foot-high chain-link fence (Figure 3). The larger downstream channel would be approximately 80 feet wide and 7 feet deep, with a 4-foot-high floodwall to contain high-tide water levels and a 6-foot-high chain-link fence.

Construction equipment is expected to consist of two excavators, one front-end loader, one backhoe, and one dump truck.



Upstream Smaller Improved Channel Section (1,400 linear feet)



Downstream Larger Improved Channel Section (1,500 linear feet)

This section describes existing conditions in the project area, evaluates the potential for the No Action Alternative and the Proposed Action to result in direct and indirect impacts on the environment, and discusses mitigation measures to avoid or minimize these impacts. This section focuses on the environmental resources for which some level of impact may result: geology, seismicity, and soils; air quality; water resources; biological resources; cultural resources; socioeconomics and safety; land use and planning; transportation; noise; and visual resources. No other resource areas require evaluation pursuant to NEPA.

4.1 GEOLOGY, SEISMICITY, AND SOILS

4.1.1 Geology

The island of Tutuila is of volcanic origin and is characterized by steep mountainsides, small valleys, and a narrow coastal fringe of relatively level land. The island is a narrow mountain range consisting of basic igneous rock, mainly basalt with small amounts of andesite and trachyte. The mountains extend approximately 20 miles from east to west and have a maximum width of 6 miles and a minimum width of 0.75 mile at Pago Pago Harbor. The highest peak is 2,142 feet, and from the tops of the mountain ridges the land slopes steeply to the ocean. Relief is approximately 2 percent slope in the project area, which generally slopes south-southeast toward the ocean. Geologic hazards on Tutuila include volcanic eruptions, earthquakes, landslides, and tsunamis.

The only active volcano in the American Samoa region is the submarine volcano Vanilulu'u. The Ofu-Olosega volcano last erupted in 1866, and the other volcanoes in the region have been silent for thousands of years. In 1995, a shallow earthquake was recorded in the region of Vanilulu'u. Such earthquakes can be precursors to volcanic activity but generally do not present a seismic threat to the islands.

Landslides occur on the island when heavy rainfall saturates unstable earth. In addition to the influence of topography, landslides are aggravated by human activities that destabilize slopes, such as deforestation, cultivation, and construction. As a result of both natural (mostly heavy rainfall) and human-induced factors, landslides have a high potential to occur on Tutuila.

Most tsunamis (huge water waves) that affect Tutuila are generated by earthquakes from fault movements along the Pacific Rim in the Aleutian Islands, South America, the Tonga Trench, and other locations. In 1868 and 1960, tsunamis originating in Chile caused damage in the Samoan Islands. The National Oceanic and Atmospheric Administration National Weather Service operates the Pacific Tsunami Warning Center, which monitors sudden earth movements throughout the Pacific Basin. Warnings are broadcast by the news media on radio and television.

4.1.1.1 *Alternative 1: No Action*

Under the No Action Alternative, no impacts would occur to the existing geology or geologic hazards.

4.1.1.2 *Alternative 2: Proposed Action*

Under the Proposed Action, no impacts would occur to geology, and the potential for volcanic eruptions, landslides, tsunamis, and earthquakes would remain unchanged. Implementation of the Proposed Action would not alter existing evacuation routes for residents during a natural disaster. Topography and geomorphology at the project site would not be impacted by implementation of the Proposed Action.

4.1.2 Seismicity

Earthquakes in American Samoa originate from the Tonga Trench, approximately 100 miles southwest of Tutuila. The Tonga Trench is located where the Pacific and Australian tectonic plates collide. The trench is considered an area of high seismic activity and generates large but distant earthquakes that are felt on Tutuila. American Samoa does not have any seismic recording instruments. All seismic recordings are measured from the Independent State of Samoa located 50 miles away.

FEMA classifies the island of Tutuila as Seismic Zone 3, which means it will experience earthquake ground shaking of approximately 0.2g peak horizontal acceleration (where “g” is the unit used to express gravitational force) and has a one in 500 chance per year of sustaining light-to-moderate building damage (i.e., 10 percent probability of experiencing ground shaking of at least 0.2g every 50 years). This Seismic Zone 3 designation considers all probable earthquake sources affecting American Samoa, local and distant, and translates their effects into different estimates of ground shaking.

Executive Order (EO) 12699, Seismic Safety of Federal and Federally Assisted or Regulated New Building Construction, requires construction of new buildings to meet standards for seismic safety set by the National Earthquake Hazard Reduction Program. However, this executive order applies only to construction of new buildings, which are defined as structures used or intended for sheltering persons or property. Because the PDM Program project does not involve new building construction, EO 12699 does not apply.

4.1.2.1 *Alternative 1: No Action*

Under the No Action Alternative, no impacts would occur to the existing seismicity.

4.1.2.2 *Alternative 2: Proposed Action*

Under the Proposed Action, the potential for earthquakes remains unchanged. An earthquake of 0.2g is unlikely to affect the proposed stream channel improvements. Evacuation routes would not be altered by implementation of the Proposed Action.

4.1.3 Soils

The soils in the project area consist of Aua very stony silty clay loam and Leafu silty clay (United States Department of Agriculture 1983). The soils are characterized by high organic matter content in the surface horizon and silty clay loam and silty clay surface textures. The soils are formed in colluvium and alluvium derived dominantly from basic igneous rock, and rooting depths are typically 60 inches or greater. The subsoil may be stony in places. Due to gentle

slopes and clay textures, the soils have slow to medium runoff rates and slight to moderate susceptibility to water erosion. The soils are subject to occasional, brief periods of flooding during prolonged, heavy rainfall. The hazard of water erosion is slight to moderate.

4.1.3.1 *Alternative 1: No Action*

Future flooding would erode soils in the project area or deposit soils from upstream in the project area.

4.1.3.2 *Alternative 2: Proposed Action*

Soils would be temporarily impacted by implementation of the Proposed Action. Construction activities such as grading, vegetation removal, and heavy equipment presence can cause compaction and leave soils exposed and susceptible to water and wind erosion. Areas that would be disturbed by construction activities would be stabilized with erosion control measures to reduce any erosion that might occur. TEMCO would employ Best Management Practices (BMPs) such as installing silt fences or mulching cleared soil to eliminate or reduce soil erosion during construction. TEMCO would implement permanent erosion control measures such as revegetation with native species when construction is completed. TEMCO would be responsible for covering soil that is stockpiled on-site for use as fill or that has been excavated from the project area and constructing a sediment barrier around stockpiles to prevent sediment loss.

4.2 AIR QUALITY

The Clean Air Act is a comprehensive federal law that regulates air emissions from area, stationary, and mobile sources. It authorizes the United States Environmental Protection Agency (USEPA) to establish National Ambient Air Quality Standards (NAAQSs) to protect public health and the environment. The NAAQSs include standards for the following five criteria pollutants: nitrogen dioxide, ozone, carbon monoxide, sulfur dioxide, and particulate matter less than 10 micrometers in diameter (PM₁₀). In addition, new NAAQSs for ozone and particulate matter less than 2.5 micrometers in diameter have not yet been implemented. Areas where the monitored concentration of a pollutant exceeds the NAAQS are classified as being in nonattainment for that pollutant. If the monitored concentration is below the NAAQS, the area is classified as being in attainment.

American Samoa is classified as being in attainment or is unclassified for carbon monoxide, ozone, and nitrogen dioxide, and in attainment for sulfur dioxide. Attainment status for PM₁₀ has not been addressed and is unclassified. Attainment designations for particulate matter less than 2.5 micrometers in diameter have not yet been determined. The air quality district for American Samoa requires preconstruction permits for stationary sources but does not have authority to issue permits for mobile sources such as construction vehicles and equipment.

In 1971, the American Samoa Environmental Quality Commission was established, and a State Implementation Plan was developed. Because American Samoa is in attainment or is unclassified for all criteria pollutants, the plan has not been updated. In addition, because American Samoa is in attainment or is unclassified for all criteria pollutants, the General Conformity Rule does not apply.

4.2.1 Alternative 1: No Action

Under the No Action Alternative, air quality standards would not be directly affected. However, the flooding in May 2003 caused damage to many residences, buildings, and roadways. These types of disasters can indirectly create air pollution due to relocation of residents, cleanup, and building repair. Support vehicles used to remove deposited sediment and debris would cause a slight, temporary increase in fugitive dust (that is, airborne particulate matter of a relatively large size). The use of support vehicles would also result in minor emissions associated with fossil fuel burning, including carbon monoxide and ozone precursors.

4.2.2 Alternative 2: Proposed Action

Implementation of the Proposed Action would result in minor, short-term deterioration of air quality. The construction-related effects of the project would be limited to increases of fugitive dust and mobile construction equipment emissions during construction.

Construction-related fugitive dust would be generated by dump trucks, delivery trucks, and other earth-moving vehicles operating at and near the construction site. The fugitive dust would result primarily from particulate matter resuspended by excavation and debris removal at the construction site, vehicle movement, dirt tracked onto paved surfaces from unpaved areas at access points, and material blown from uncovered haul trucks. These vehicles would also release minor emissions associated with fossil fuel burning, including carbon monoxide and ozone precursors.

Emissions during construction activities were calculated due to the proximity of homes and businesses to the project area. Emissions from construction equipment were estimated using factors from the *California Environmental Quality Act Guidelines*, Tables A9-8A and A9-8B (South Coast Air Quality Management District 1993). These factors and estimates of equipment usage for the construction period were used to calculate daily emissions. Emission estimates were based on an 8-hour day and assumed a 50-percent load factor (i.e., each piece of equipment would be used 4 hours per day). Annual emission totals assume the project would take 52 weeks to complete and all equipment would be used for the entire period. Emission estimates are summarized in Table 1.

Table 1
Air Quality Emissions from Construction Equipment

Equipment Description	Carbon Monoxide	Nitrogen Oxides	Sulfur Oxides	PM ₁₀
Emission Factors (pounds per hour)				
Excavator	0.011	0.024	0.002	0.0015
Loader	15.57	0.518	0.023	0.03
Backhoe	0.015	0.022	0.002	0.001
Dump truck	1.8	4.17	0.45	0.26
Emissions Estimates (pounds per day)				
Excavator ¹	0.176	0.384	0.032	0.024
Loader ¹	124.56	4.144	0.184	0.24
Backhoe ¹	0.12	0.176	0.016	0.008
Dump truck ¹	14.4	33.36	3.6	2.08
Total	139.26	38.06	3.83	2.35
Emissions Estimates (tons per year)				
Total	18.1	4.9	0.5	0.3

¹ Estimate assumes two pieces of equipment.

Assuming construction at these daily rates would continue for a full year, total emissions would fall well below “significant emissions” thresholds established under USEPA’s Prevention of Significant Deterioration program (40 CFR Part 51.166[b][23][i]). Emissions below these thresholds would not cause or contribute to a violation of a NAAQS. To further minimize air quality impacts, TEMCO would employ the following measures to limit emissions, fugitive dust, and exhaust: maintaining and covering spoil piles, covering the load of haul vehicles containing fill or cut, and keeping construction equipment properly tuned.

4.3 WATER RESOURCES

The primary drainage feature in Pago Pago Village is Vaipito Stream. Vaipito Stream captures runoff from several tributary streams and discharges into Pago Pago Harbor (Figure 2). The most significant tributary, Laolao Stream, is located in the lower part of the watershed. The watershed area of Vaipito Stream is approximately 1.4 square miles. Vaipito Stream flows year-round, often in response to heavy precipitation events that are common on Tutuila. The climate is rainy year-round, with rain on about 50 percent of the days of the year. The mountainous areas of the island receive approximately 200 inches of rain per year, mostly during the wet season (October through May).

4.3.1 Coastal Zone Management

The entire island of Tutuila is within the coastal zone as designated by the American Samoa Coastal Management Program (ASCMP). The federal consistency provisions of the Coastal Zone Management Act require that all federally funded, licensed, or permitted projects affecting the

coastal zone be conducted in a manner that is consistent with the state or territory's coastal zone management plan, in this case the ASCMP.

4.3.1.1 Alternative 1: No Action

Under the No Action Alternative, no impacts would occur to the coastal zone as designated by the ASCMP. Future flooding would wash soils and debris into Pago Pago Harbor.

4.3.1.2 Alternative 2: Proposed Action

TEMCO would be responsible for applying for and obtaining a federal consistency certification from the American Samoa Department of Commerce (ASDOC) with the finding that the Proposed Action would be conducted in a manner consistent with the ASCMP. Impacts to coastal resources would be minimized by the application of mitigation measures described in Sections 4.1.3.2 and 4.3.3.2 of this EA. In the long term, the Proposed Action would benefit the coastal zone by allowing floodwaters to flow through the project area without carrying soil and debris from Pago Pago Village into Pago Pago Harbor.

4.3.2 Flood Hazards

According to the 1991 FEMA Flood Insurance Rate Map (FIRM) for the project area, the area is within Zone AE, an area subject to inundation during a flood having a 1 percent chance of occurrence in any given year (also referred to as the 100-year flood or base flood). Base flood elevations for the project area, as shown on the FIRM, are between 0 and 25 feet above mean sea level. A Flood Insurance Study (FIS) conducted by FEMA provides flood discharge values for Vaipito Stream.

In addition to the flood hazard data developed by FEMA for the FIRM, the United States Army Corps of Engineers (USACE) Pacific Ocean Division developed simplified peak discharge equations for various flood frequency events on Vaipito Stream (American Samoa Government 1991). The USACE discharge values are conservative when compared with the FIS discharges.

EO 11988, Floodplain Management, requires federal agencies to avoid, to the extent possible, the short- and long-term adverse impacts associated with the occupancy and modification of floodplains. FEMA's regulations for complying with EO 11988 are found at 44 CFR Part 9.

4.3.2.1 Alternative 1: No Action

Under the No Action Alternative, flooding impacts would continue to occur within the existing floodplain. Floodwaters would continue to periodically inundate buildings within Pago Pago Village and adjacent roadways, resulting in sediment deposition, property damage, impacts to water quality, disruption of emergency services, threats to health and safety, and socioeconomic losses.

4.3.2.2 Alternative 2: Proposed Action

Effect of the Proposed Action on Flood Levels

Using the USACE (1991) peak discharge equations, HW Consulting (2003) calculated peak discharges and flood depths for various flood frequency events at two locations on Vaipito Stream. The data presented in Table 2 compare existing conditions in the channel and the expected flood depths after implementation of the Proposed Action for Vaipito Stream at the upstream and downstream end of the Proposed Action. Flood depth is the depth of water measured from the bottom of the stream channel.

Table 2
Vaipito Stream Peak Discharge and Flood Depth Calculations

Flood Frequency	USACE Discharge ¹ (cubic feet per second)	Upstream Channel		Downstream Channel	
		Depth of Improved Channel ¹ (feet)	Flood Depth ¹ (feet)	Depth of Improved Channel ² (feet)	Flood Depth ² (feet)
2 year	958	7.0	2.3	11.0	3.17
10 year	1,595	7.0	2.87	11.0	3.96
50 year	2,069	7.0	3.2	11.0	4.36
100 year	2,248	7.0	3.3	11.0	4.48

¹Location near demolished CCCAS church and inlet of smaller improved channel section

²Location near Highway 1 at inlet of larger improved channel section

As indicated in Table 2, the project is designed to contain the 100-year flood to the improved channel; according to HW Consulting (2003), the channel would “significantly reduce flooding for the properties located in the lower section of Vaipito basin and the surrounding area, including the main arterial road linking the eastern and western sections of the island.” Additionally, the proposed action would reduce flood elevations upstream of the project area. However, related conditions may cause the flood to overtop the channel, as discussed below.

As stated above, the Proposed Action would include construction of 4-foot-high floodwalls on either bank of the larger downstream channel where it flows into the harbor. The floodwalls would increase the depth of the improved channel to 11 feet in this reach, thereby providing a degree of protection from tidal flooding. However, the area where these walls are to be constructed is shown on the FIRM as Zone VE, an area of flooding with additional hazards associated with wave action. The base flood elevation for this area, including wave height, is 11 feet. FEMA cannot recognize this floodwall as providing protection from the 100-year flood associated with the harbor. Therefore, although the floodwall may provide protection from smaller, more frequent flooding events, FEMA cannot revise the FIRM to remove the Zone VE flood designation that represents the 100-year flood hazard.

Conditions To Be Met During Design/Construction

A detailed design and complete hydraulic modeling have not yet been developed for the Proposed Action. Consequently, a full evaluation of the performance of the channel, in terms of

conveying floodwaters, cannot be completed at this time. The following issues are currently unresolved:

- Vaipito Stream currently overtops the Highway 1 bridge during flooding events. The FIS indicates that the bridge is overtopped during the discharge of the 100-year flood and that backwater effects from this condition affect nearby properties. Under the Proposed Action, flood flows would be diverted to the existing Highway 1 crossing of Laolao Stream. This crossing also appears to be inadequate to pass the 100-year flood. The improved channel would be much wider than the existing opening beneath this crossing, and the Proposed Action does not include plans to increase the size of the opening. It is possible that this condition could result in backwater effects that overtop the improved channel, despite the fact that the channel is designed to contain the 100-year flood.
- The preliminary design calls for a 90-degree bend in the improved channel in the immediate vicinity of Pago Pago Elementary School. The ability of the channel to convey flow through this bend cannot be determined. If the channel were to overtop at this location, the school would be at risk of flooding. The risk of flooding to the school is further increased by the fact that the improved channel would carry all flood flow from the entire watershed much closer to the school than under current conditions.
- Any debris or blockage in the channel could cause increases in flood depth and overflow outside the channel. Consequently, failure to maintain the channel could result in significant flooding.

TEMCO would be responsible for resolving these issues when a more detailed design for the project is completed. Regulations at 44 CFR Part 65.12 require communities that participate in the National Flood Insurance Program (NFIP) to request a conditional Letter of Map Revision (LOMR) when proposing construction in the 100-year floodplain that will increase base flood elevations. Among other requirements, these regulations stipulate that such construction must not increase the flood hazard to existing, insurable structures (such as the school, residences, and the church). Therefore, TEMCO would prepare a conditional LOMR request in accordance with these regulations, and the American Samoa Government would submit that request to FEMA for review. The request would include more detailed design information; a hydraulic analysis prepared using acceptable modeling methods, including evaluation of structures such as the Highway 1 bridge; and a maintenance plan to keep the channel free from debris, dense vegetation, and other objects. TEMCO would be responsible for revising the design as necessary such that the Proposed Action results in FEMA issuing a conditional LOMR.

Executive Order 11988- Floodplain Management

In compliance with Executive Order 11988, FEMA considered the Proposed Action's impacts to the floodplain. FEMA applies the Eight-Step Decision-Making Process to ensure that it funds projects consistent with EO 11988. The NEPA compliance process involves essentially the same basic decision-making process to meet its objectives as the Eight-Step Decision-Making Process. Therefore, the Eight-Step Decision-Making Process has been applied through implementation of the NEPA process. FEMA published an Initial Public Notice at the declaration of the May 2003 disaster. FEMA would ensure publication of a Final Public Notice in compliance with Executive Order 11988 before implementation of the Proposed Action.

The functional nature of the project requires that it be located in the floodplain. The project would likely reduce the threat of flooding to existing structures during events that occur more frequently than the 100-year event. However, as described above, the project's performance under conditions prevalent during the 100-year flood cannot be determined at this time. If the design issues identified above are addressed, the project would result in the elimination of the 100-year floodplain upstream of the Highway 1 bridge. This would provide a benefit to existing structures and would allow use of currently floodprone lands. If the channel does not provide this level of protection, the project area would continue to be subject to a flood risk. Any new construction or substantial improvement of existing structures in the floodplain must comply with the elevation requirements of the local floodplain management ordinance and the NFIP regulations.

As stated above, the area downstream of Highway 1 is subject to coastal flooding and the additional hazards posed by wave action. While the project would reduce the impact of flooding from more frequent flood events, it would not provide protection from the 100-year coastal flood. Therefore, development in this area would continue to be subject to the requirements of the local floodplain management ordinance and the NFIP regulations.

4.3.3 Water Quality

The American Samoa Environmental Protection Agency (ASEPA) maintains programs in water quality and drinking water under the American Samoa Office of the Governor. The ASEPA has identified three major water quality concerns on Tutuila: (1) sedimentation from improper land use practices that pours into streams and coastal waters after heavy rains, (2) nutrient enrichment from human and animal wastes in populated areas, and (3) contamination in Pago Pago Harbor.

Of most concern is the water quality in Pago Pago Harbor. In 1991, the ASEPA determined that elevated levels of various heavy metals and pesticides were present in fish, seawater, and sediment in the inner portion of Pago Pago Harbor. Coral reefs surrounding Tutuila are also impacted by poor water quality. Natural phenomena such as hurricanes and disease have always taken their toll on reefs, but their effects are exacerbated by human activities in the ocean and on land. Besides destructive fishing practices and coral collecting, impacts come from sewage and other effluents and from sediments eroded from agricultural and construction operations.

Potential groundwater contamination is another concern on Tutuila. However, in Pago Pago Village, the steep topography generally does not allow sufficient time for groundwater recharge, so no major aquifer exists in the project area.

Vaipito Stream is considered a jurisdictional water of the United States. Section 404 of the Clean Water Act requires that project proponents receive a United States Department of the Army permit for work involving the discharge of dredged or fill materials in waters of the United States. USACE is responsible for reviewing projects for Department of Army permits. Section 401 of the Clean Water Act requires that applicants for federal permits or licenses to conduct work involving any discharge into waters of the United States receive a Water Quality Certification. ASEPA is responsible for reviewing projects for Water Quality Certification.

4.3.3.1 *Alternative 1: No Action*

Under the No Action Alternative, existing water quality conditions would remain unchanged. Potential water quality impacts to Vaipito Stream and Pago Pago Harbor from land-borne contaminants such as garbage and sediment that are mobilized by floodwaters and discharged into the stream would continue.

4.3.3.2 *Alternative 2: Proposed Action*

In the long term, implementation of the Proposed Action would improve water quality due to most flood flows staying in the channel instead of inundating developed areas where floodwaters would mobilize pollutants such as oil and grease, debris, suspended sediments, and wastes. The Proposed Action would, therefore, have a beneficial impact on surface water quality in Vaipito Stream and Pago Pago Harbor. It is not anticipated that the Proposed Action would result in impacts to groundwater quality.

TEMCO would implement BMPs including preparing and implementing an erosion control plan to reduce potential erosion from construction activities. Other BMPs may include but are not limited to using silt fencing, covering stockpiled soils, mulching cleared areas, and revegetating with native species.

TEMCO would be required to apply for and obtain a Department of Army Permit from the USACE in compliance with Section 404 of the Clean Water Act. TEMCO would also be required to apply for and obtain a Water Quality Certification from ASEPA in compliance with Section 401 of the Clean Water Act.

4.4 BIOLOGICAL RESOURCES

Biodiversity of terrestrial species in American Samoa is low due to the islands' remote locations, but the surrounding marine environment is extremely diverse. Most native species are closely related to those of Indonesia (Craig 2002). These islands have many pests and approximately 250 nonnative vascular plants (Craig 2002).

The main vegetation type found on Tutuila is tropical rainforest. However, many nonnative plants were introduced and have outcompeted the native plants in disturbed environments (Whistler 1995). A narrow ring around the island contains shallow coastal habitats that support coral reef ecosystems. The deepwater habitats are steep and reach depths of 2,000 feet within 0.5 to 2 miles from the coast (Craig 2002).

The project area consists of an urbanized riparian area dominated by nonnative species. However, the project area is in close proximity to undeveloped rainforest to the south. The Samoan rainforest has a wide variety of native and nonnative plant species. Trees include two species of native banyan trees (or *aoa*) (*Ficus prolixa* and *F. oblique*), a nonnative banyan tree (*pulu* or Mexican rubber tree; *Castilla elastica*), *fetau* (*Calophyllum inophyllum*), the nonnative *ifi* or Polynesian chestnut (*Inocarpus fagifer*), and native species such as *a'amati'e* (*Elaeocarpus floridanus*), *asi* (*Syzygium inophylloides*), and *tava* or island lychee (*Pometia pinnata*). Some areas on the island may be dominated by *togo* or mangroves (*Rhizophora mangle* and *Bruguiera gymnorrhiza*). Other fruit trees include *gasu* (*Palaquium stehlinii*), *ulu* or breadfruit (*Artocarpus altilis*), *atone* or nutmeg (*Myristica inutilis*), and *moso'oi* or perfume tree (*Cananga odorata*).

Some of the native wildlife found in this tropical rainforest includes the Samoan fruit bat (*Pteropus samoensis*), white-naped fruit bat (*Pteropus tonganus*), sheath-tailed bat (*Emballonura semicaudata*), pelagic gecko (*Cyrtodactylus pelagicus*), Polynesian gecko (*Gehyra oceanica*), mourning gecko (*Lepidodactylus lugubris*), stump-toed gecko (*Peropus mutilatus*), snake-eyed skink (*Ablepharus boutonii*), Micronesian skink (*Emoia adspersa*), azure-tailed skink (*Emoia cyanura*), Lawes skink (*Emoia lawesii*), black skink (*Emoia nigra*), Samoan skink (*Emoia samoensis*), and moth skink (*Lipinia noctua*).

Stream edges in Tutuila are typically dominated by *Brachiaria mutica*, *Coix* sp. and *Canna* sp., as well as many other weedy species found in taro patches (Volk 1991). Urbanized or agricultural areas near streams frequently have mango (*Mangifera indica*), coconut (*Cocos nucifera*), papaya (*Carica papaya*), banana (*Musa paradisiacal*), and fig (*Ficus* spp.). *Barringtonia samoensis*, a medium-sized tree closely related to the dominant coastal forest tree *Barringtonia asiatica*, is commonly found along mountain streams (Volk 1991).

Several species have been introduced from Polynesian islands. Introduced wildlife species include three species of rats, the house mouse (*Mus musculus*), pigs (*Sus scrofa*), domesticated dogs (*Canis familiaris*), feral cats (*Felis domesticus*), the house gecko (*Hemidactylus frenatus*), the blind burrowing snake (*Typhlops braminus*), and the marine toad (*Bufo marinus*).

The project area consists mainly of disturbed and developed land. Mesquite (*Prosopis pallida*), coconut trees, banana trees, and banyan trees occur in the project area. The understory is made up of, among others, the Convolvulaceae (morning-glory), Asteraceae (sunflower), and Malvaceae (mallow) families. Other notable ornamentals include Chinese hibiscus (*Hibiscus rosa-sinensis*) and red ginger (*Alpinia purpurata*). Groundcover includes the Gramineae (grass) and Cyperaceae (sedge) families.

4.4.1 Threatened and Endangered Species

The Endangered Species Act (ESA) of 1973 establishes a federal program to conserve, protect, and restore threatened and endangered plants and animals and their habitats. Section 7 of the ESA specifically charges federal agencies with the responsibility of using their authority to conserve threatened and endangered species. All federal agencies must ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a threatened or endangered species or result in the destruction of critical habitat for these species.

FEMA obtained information concerning species that are listed as endangered or threatened, proposed for listing as endangered or threatened, or candidates for listing as endangered or threatened under the ESA that may occur in the project area. Table 3 identifies four sea turtle species that are federally listed under the ESA. However, the project area does not provide habitat to support any of these federally listed species. No other species protected under the ESA are known or expected to occur in American Samoa.

Table 3
Special-Status Species with Potential to Occur in American Samoa

Scientific Name	Common Name	Federal Status	Preferred Habitat	Likelihood of Occurrence in Project Area
<i>Caretta caretta</i>	Loggerhead sea turtle	T	Open ocean. Nests in sandy beaches.	No potential because suitable habitat is not present in the project area.
<i>Chelonia mydas</i>	Green sea turtle	T	Open ocean. Nests in sandy beaches.	No potential because suitable habitat is not present in the project area.
<i>Dermochelys coriacea</i>	Leatherback sea turtle	E	Open ocean. Nests in sandy beaches.	No potential because suitable habitat is not present in the project area.
<i>Eretmochelys imbricata</i>	Hawksbill sea turtle	E	Open ocean. Nests in sandy beaches.	No potential because suitable habitat is not present in the project area.

T = threatened, E = endangered

4.4.1.1 *Alternative 1: No Action*

Under the No Action Alternative, no new impacts would occur to federally listed threatened or endangered species. Sediment, debris, and pollutants from flooding have the potential to adversely affect coral reefs which protected turtles use for foraging.

4.4.1.2 *Alternative 2: Proposed Action*

The Proposed Action would not adversely affect any federally listed species because habitat suitable to support the species identified in Table 3 is not present in the project area. Implementation of BMPs, as previously described, would limit temporary impacts to the marine environment downstream of the project area, where protected turtles have the potential to occur. Permanent impacts of the Proposed Action would benefit marine waters and coral reefs used by protected turtles by reducing deposition of debris and sediment in Pago Pago Harbor. The Proposed Action would comply with Section 7 of the ESA.

4.4.2 Executive Order 13112: Invasive Species

Under EO 13112, dated February 3, 1999, projects that occur on federal lands or are federally funded must be “subject to the availability of appropriations, and within administration budgetary limits, use relevant programs and authorities to: (i) prevent the introduction of invasive species; (ii) detect and respond rapidly to, and control, populations of such species in a cost-effective and environmentally sound manner; (iii) monitor invasive species populations accurately and reliably; and (iv) provide for restoration of native species and habitat conditions in ecosystems that have been invaded.”

As described in Section 4.4, many invasive species currently occur in the project area.

4.4.2.1 *Alternative 1: No Action*

Under the No Action Alternative, no impacts would occur to invasive species.

4.4.2.2 *Alternative 2: Proposed Action*

Under the Proposed Action, vegetation would be cleared from the construction area, including invasive and native species. Upon completion of the Proposed Action, the cleared areas would be revegetated with native species, thus decreasing invasive species in the project area. TEMCO would ensure that any imported fill or other construction materials would be certified as being free from containing invasive species.

4.4.3 Executive Order 11990: Protection of Wetlands

EO 11990 requires federal agencies to take action to minimize the destruction or modification of wetlands by considering both direct and indirect impacts to wetlands that may result from federally funded actions.

Wetlands and deepwater habitats of Vaipito Stream and Laolao Stream include three zones, as classified by Cowardin et al. (1979). In their upper reaches, the streams are riverine, intermittent streambeds. The middle zones are riverine, perennial rock bottom. As the streams reach Pago Pago Harbor, they transition to wetlands classified as riverine, tidal, unconsolidated bottom. Work involving dredging or filling wetlands is subject to Section 404 of the Clean Water Act, as described in Section 4.3.3.

4.4.3.1 *Alternative 1: No Action*

Under the No Action Alternative, no impacts would occur to wetlands.

4.4.3.2 *Alternative 2: Proposed Action*

In compliance with EO 11990, FEMA considered the Proposed Action's impacts to wetlands. FEMA applies the Eight-Step Decision-Making Process to ensure that it funds projects consistent with EO 11990. The NEPA compliance process involves essentially the same basic decision-making process to meet its objectives as the Eight-Step Decision-Making Process. Therefore, the Eight-Step Decision-Making Process has been applied through implementation of the NEPA process. FEMA published an Initial Public Notice at the declaration of the May 2003 disaster. FEMA would ensure publication of a Final Public Notice in compliance with EO 11990 before implementation of the Proposed Action.

The functional nature of the project requires that it affect wetlands. TEMCO would be required to apply for and obtain a Department of Army Permit from the USACE in compliance with Section 404 of the Clean Water Act and implement all mitigation measures described in this permit. TEMCO would minimize the disturbance to wetlands to only those portions of the channel necessary to complete the project. With implementation of these measures, the Proposed Action would comply with EO 11988.

4.4.4 Executive Order 13089: Coral Reef Protection

EO 13089 requires federal agencies to ensure that actions they authorize, fund, or implement will not degrade coral reef ecosystems. As mentioned in Section 4.4, much of Tutuila is surrounded by a fringing coral reef. Historically, coral has been used as fill and as aggregate in concrete or asphalt mixes.

4.4.4.1 *Alternative 1: No Action*

Under the No Action Alternative, impacts to coral reef ecosystems would occur as they do currently. Sedimentation associated with flood events has the potential to wash into Pago Pago Harbor and eventually settle on coral reefs. Sedimentation is a major cause of coral reef degradation.

4.4.4.2 *Alternative 2: Proposed Action*

TEMCO would ensure that coral is not a component of fill materials or used in the concrete mixture for the Proposed Action. Because the Proposed Action would reduce sediment flowing into Pago Pago Harbor from most storm events, the Proposed Action would have a long-term beneficial impact on the coral reef ecosystem. TEMCO would implement BMPs as previously described to reduce construction-related impacts. Therefore, the Proposed Action would comply with EO 13089.

4.5 CULTURAL RESOURCES

In addition to review under NEPA, consideration of impacts to cultural resources is mandated under Section 106 of the National Historic Preservation Act. Requirements include identifying significant historic properties and districts that may be affected by a federal undertaking and mitigating adverse effects to those resources.

URS Corporation, as a consultant to FEMA, conducted a pedestrian archaeological reconnaissance of the project area on May 12, 2004. The survey was negative for any prehistoric or historic archaeological or built-environment cultural resources. No properties eligible to the National Register of Historic Places were identified through a literature review or pedestrian survey of the project area. There is a potential for subsurface cultural deposits to be associated with the previously demolished CCCAS church or earlier settlements (Figure 2).

4.5.1 *Alternative 1: No Action*

Under the No Action Alternative, no impacts would occur to cultural resources.

4.5.2 *Alternative 2: Proposed Action*

Based on the archaeological survey and conference with American Samoa Historic Preservation Officer (ASHPO), FEMA determined the Proposed Action would not affect historic properties. However, FEMA would require that TEMCO retain a qualified archaeological monitor during any project-related construction activity that results in new ground disturbance in the area where the channel would cross within or immediately adjacent to the demolished CCCAS church. Due to the possibility that previously unidentified archaeological resources could be discovered during project construction, TEMCO would be required to halt work in the event of an unanticipated discovery and notify FEMA as soon as practicable. FEMA may then require TEMCO to stop construction in the vicinity of the discovery and would require TEMCO to take all reasonable measures to avoid or minimize harm to the property until FEMA concludes consultation with the ASHPO. Should human remains be encountered, TEMCO would be required to halt work in the vicinity and notify the Territorial Coroner. FEMA transmitted a letter

to the ASHPO on June 2, 2004, with a notification of its determination and its proposal for treatment of an unanticipated discovery. FEMA assumed ASHPO's concurrence with FEMA's findings based on the ASHPO's lack of a response by the time of production of this EA.

4.6 SOCIOECONOMICS AND SAFETY

According to the 2000 Census (United States Census Bureau 2003), American Samoa has experienced a population growth of over 22 percent between 1990 (46,773) and 2000 (57,291). Much of the growth has happened in the most densely inhabited island of Tutuila, and the population of Pago Pago Village has grown proportionately from approximately 3,500 in 1990 to about 4,280 in 2000. The population of Pago Pago represents 7.5 percent of the total population of American Samoa (United States Census Bureau 1992, 2003). Because the topography of the island is steep and large parts of the land are virtually inaccessible, rapid development on some parts of the island has placed considerable demand on coastal areas and along waterways such as Vaipito Stream. Many homes and businesses are also located along the water, making them directly subject to the effects of flooding.

The population in the project area is generally quite young. The median age in American Samoa is about 21.3 years. In Pago Pago Village, the median age is 21.7, with less than 3 percent of the population being 65 or older. Throughout American Samoa, including in the village of Pago Pago, over 85 percent of the population is ethnic Samoan. Small fractions of the population are of Asian, White, or other ethnic backgrounds.

According to 2000 Census data, American Samoa has 9,349 households with an average household size of 6.05 people. The median household income is \$18,219, and the per capita income is \$4,357. Approximately 61 percent of all individuals in American Samoa are living below the poverty level. Pago Pago Village has 708 households with an average household size of 6.04 people, and a median household income of \$19,146. Fifty-six percent of the population of Pago Pago is identified as living below the poverty line.

Total employment in American Samoa is estimated at 17,664, or 52 percent of the population over 16 years of age. Approximately 2.7 percent of the population is unemployed. In Pago Pago Village, approximately 60 percent of the population, or 2,548 people, is employed. The manufacturing industry is the largest employer, followed by the education, health, and social services; public administration; and retail trade industries.

4.6.1 Environmental Justice

EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, dated February 11, 1994, directs federal agencies to take appropriate and necessary steps to identify and address disproportionately high and adverse effects of federal projects on the health or environment of minority and low-income populations to the greatest extent practicable and permitted by law. Demographic data from Pago Pago Village was studied to determine whether a disproportionate number (defined as greater than 50 percent) of minority or low-income persons have the potential to be affected by the alternatives under review.

4.6.1.1 *Alternative 1: No Action*

Under the No Action Alternative, the areas surrounding Vaipito Stream would continue to be subject to floods. Because no federal action would occur under the No Action Alternative, compliance with EO 12898 is not required.

4.6.1.2 *Alternative 2: Proposed Action*

As described above, the population residing in the project area is principally ethnic Samoan. In addition, 56 percent of the local population lives below the poverty line. Therefore, any impacts associated with the Proposed Action would likely have disproportionate effects on minority and low-income populations. However, no substantial adverse impacts are expected to occur as a result of the Proposed Action. All adverse impacts would be temporary, and TEMCO would implement mitigation measures to minimize these impacts. In general, the Proposed Action would benefit most residents of American Samoa by reducing the potential for flooding in Pago Pago Village and providing access between the east and west sides of Tutuila on Highway 1. Therefore, the Proposed Action would comply with EO 12898.

4.6.2 Public Health and Safety

The main arterial road connecting the east and west side of the island (Highway 1) as well as residences and businesses are located along the shoreline and are vulnerable to damage by flooding. Blockage of Highway 1, Fagasa Road, and other roads in Pago Pago Village restricts access for emergency vehicles and prevents residents and employees on the east side of the island and in Pago Pago Village from accessing the only full-service medical care facility in American Samoa, located in the village of Faga'alua.

4.6.2.1 *Alternative 1: No Action*

Under the No Action Alternative, Pago Pago Village and areas surrounding Vaipito Stream would continue to be subject to floods. Residences, businesses, and roadways would continue to receive damage from flood events, and emergency access would continue to be disrupted when roads are blocked.

4.6.2.2 *Alternative 2: Proposed Action*

Implementation of the Proposed Action would reduce flood damage in Pago Pago Village and help to ensure that roadways are open for emergency access. Construction of a chain-link fence on either side of the stream would provide greater public health and safety, directly benefiting local residents and visitors.

4.7 LAND USE AND PLANNING

The project area is urbanized, consisting of residential, commercial, recreational, and institutional/governmental land uses. Over 96 percent of the land in American Samoa is owned in a traditional communal manner where the village chief (*matai*) regulates the occupancy and use of land within his/her village.

All government-sponsored projects must undergo the ASDOC Project Notification and Review System, a process that ensures a project is properly permitted and that all government land use laws and regulations are met.

4.7.1 Alternative 1: No Action

Under the No Action Alternative, no impacts to the existing land ownership or land uses would occur.

4.7.2 Alternative 2: Proposed Action

Most components of the Proposed Action including construction of the improved channel, construction of the two upstream bridges, and all staging areas would be located on land held by Pago Pago Village. Construction involving Highway 1, including a bridge, would be under the American Samoa Government jurisdiction. The American Samoa Government Parks and Recreation Department operates Pago Pago Park at the downstream end of the project area. The Proposed Action would not encroach onto park land. Unoccupied sections of Pago Pago Park may be used for a staging or storage area.

The Pago Pago Village Council granted Chief Gi Malala the authority to speak on their behalf to the American Samoa Government. Chief Gi gave verbal permission to the American Samoa Government and TEMCO to complete the Proposed Action within the village, as verbal permission instead of paper documentation with signatures is the proper protocol for land use authorization in Samoan culture. No changes in land ownership would occur, and no formal easements or land transfers would be necessary. Implementation of the Proposed Action would modify some existing land use of the project area, as portions of residential and recreational property would be converted into the proposed channel and the two *fales* would be demolished and rebuilt on vacant land within the immediate vicinity. These land use changes would have minimal adverse effects. TEMCO would be responsible for applying for and obtaining Project Notification and Review System approval including the use of Pago Pago Park as a staging or storage area.

4.8 TRANSPORTATION

Highway 1 is the main arterial road that connects the east and west sides of the island. Highway 1 is the only access for emergency vehicles and residents living on the east side of the island to reach the only medical facility on the island, in Faga'alu Village. Fagasa Road is the main access road into Pago Pago Village from Highway 1. Pago Pago Elementary School Road connects the Pago Pago Elementary School to Fagasa Road less than 1/4 mile from Highway 1 and passes directly in front of the demolished CCCAS church lot. Emergency access for residents of Fagasa and Pago Pago Villages, including Pago Pago Elementary School Road to Highway 1, is limited to Fagasa Road.

4.8.1 Alternative 1: No Action

Under the No Action Alternative, access to the residences and businesses in Pago Pago Village and access along Highway 1 would continue to be periodically disrupted during flood events.

4.8.2 Alternative 2: Proposed Action

Implementation of the Proposed Action and related construction activities would temporarily cause increased traffic on Highway 1 and Fagasa Road due to workers and haul trucks traveling to and from the project area. TEMCO would ensure that all staging areas, construction equipment, and project-related vehicles would not obstruct traffic on Highway 1, since it is the only route for emergency vehicles and residents to access areas east and west of the project area on the island.

Further analysis is required to determine if the Highway 1 Bridge would need to be widened to pass the flow in the improved channel due to the transitioning of the smaller channel into the larger channel. The preference would be to keep the existing bridge intact with modifications underneath to accommodate the transition. However, in the event the bridge would need widening, TEMCO would coordinate this effort with the American Samoa Department of Public Works and the Federal Highways Administration. If the bridge is widened, TEMCO would construct a temporary bridge downstream to re-route traffic until the construction has been completed.

Staging areas for equipment would be located in the demolished CCCAS Catholic church parking lot and in Pago Pago Park near the mouth of Vaipito Stream.

Students and employees of Pago Pago Elementary School would experience the temporary inconvenience of traffic congestion and Pago Pago Elementary School Road blockage or obstructions during the upstream smaller improved channel phase of construction. Current access routes to and from school would be disrupted, and schoolchildren and personnel may need to use alternate routes during this phase of construction. Private residences immediately adjacent to the project area, especially along Pago Pago Elementary School Road, would also experience traffic congestion and road blockages, including difficulty parking at their residences during project construction. Some residents would temporarily have to use alternate routes to access their homes and would have to park vehicles at nearby locations during parts of project construction. TEMCO would provide written notice of the construction schedule to all residents who would have limited access to their homes during construction.

4.9 NOISE

Noise is federally regulated by the Noise Control Act of 1972. Although the Noise Control Act tasks the USEPA to prepare guidelines for acceptable ambient noise levels, it only charges those federal agencies that operate noise-producing facilities or equipment to implement noise standards. By nature of its mission, FEMA does not have statutes defining noise.

Certain land uses are sensitive to noise. Noise-sensitive receptors are located at land uses associated with indoor and/or outdoor activities that may be subject to stress or significant interference from noise. They often include residential dwellings, mobile homes, hotels, motels, hospitals, nursing homes, educational facilities, and libraries. The closest noise-sensitive land uses to the project area consist of a Mormon church, Pago Pago Elementary School, local businesses, Pago Pago Park, and several residences. Noise sources in the project area are typical of residential and commercial areas, primarily vehicle traffic and air-conditioning units.

4.9.1 Alternative 1: No Action

Under the No Action Alternative, noise would remain at current levels.

4.9.2 Alternative 2: Proposed Action

Construction noise is unavoidable and could adversely affect nearby residents and people at other noise-sensitive land uses during construction. However, the noise would be temporary and limited to the duration of project construction, which would occur in phases over approximately 1 year. The exact complement of noise-producing equipment that would be in use during any particular period is difficult to predict. However, the noise levels from construction activity during various phases of similar construction projects have been evaluated, and their use yields an acceptable prediction of a project's potential noise impacts. Based on USEPA (1971) data of similar public works projects, average noise levels generated by the Proposed Action are estimated to be 88 dBA L_{eq} (the energy averaged noise level, in A-weighted decibels) at a distance of 50 feet. Noise levels of this magnitude, although temporary, would be readily audible and would dominate the noise environment in the area during construction operations. Typically, the magnitude of construction noise emission varies over time because construction activity is intermittent and power demands on construction equipment (and the resulting noise output) are cyclical.

Noise levels generated at any point source decrease at a rate of approximately 6 decibels per doubling of distance away from the source (Diehl 1973). Therefore, noise levels would be 82 dBA at 100 feet from the center of construction activity, 76 dBA at 200 feet, and 70 dBA at 400 feet. This calculated reduction in noise level is based only on losses resulting from spreading of the sound wave as it leaves the source and travels outward. Shielding, such as buildings, that block the line of sight would attain an additional 5 dBA or more reduction.

TEMCO would be responsible for implementing the following measures to reduce noise levels and their effects to the extent practicable:

1. Construction operations would not occur between 5:00 p.m. and 7:00 a.m. Monday through Friday. Construction operations would not take place on Saturday, Sunday, or holidays. The hours of construction including noisy maintenance activities and all spoils and material transport would be restricted to the periods and days listed.
2. All noise-producing project equipment and vehicles using internal combustion engines (including haul trucks) would be fitted with mufflers, air-inlet silencers where appropriate, and any other appropriate shrouds, shields, or other noise-reducing features. These devices would be maintained in good operating condition so as to meet or exceed original factory specifications. Mobile or fixed "package" equipment (e.g., arc welders, air compressors) would be equipped with shrouds and noise control features that are readily available for that type of equipment.
3. All mobile or fixed noise-producing equipment used on the project that is regulated for noise output by a local, state, or federal agency would comply with such regulation while in the course of project activity.
4. At least 20 days prior to commencement of construction, TEMCO would provide written notification to property owners and residents within 500 feet of the project area and to the Pago Pago Village Chief. A notice would be posted at the access to the construction site. The

notice would provide a construction schedule, required noise conditions applied to the project, and the name and telephone number of the project manager who can address questions and problems that may arise during construction.

5. The use of noise-producing signals, including horns, whistles, alarms, and bells, would be for safety warning purposes only.
6. All project workers exposed to noise levels above 80 dBA would be provided with personal protective equipment for hearing protection (i.e., earplugs and/or earmuffs). Areas where noise levels are routinely expected to exceed 80 dBA would be clearly posted with signs stating "Hearing Protection Required in this Area."

4.10 VISUAL RESOURCES

The existing visual character of the project area includes a mix of native and introduced tropical vegetation; Vaipito Stream; and residential, religious, and business buildings. The existing visual character is typical within the region, and no areas of scenic importance exist. Primary viewers adjacent to the project area consist of nearby residents, employees, students, and visitors of Pago Pago Village.

4.10.1 Alternative 1: No Action

Under the No Action Alternative, no impacts would occur to existing visual resources.

4.10.2 Alternative 2: Proposed Action

The Proposed Action would have a temporary effect on the character of the setting. During construction, existing vegetation, rock, and debris would be removed from the channel and immediately surrounding areas, and construction activities would be visible from all residences, Pago Pago Elementary School, the Mormon church, businesses, and roads.

The visual character of the setting would not permanently change because modifications to the channel would not substantially degrade or alter the existing visual character or quality of the site surroundings. Implementation of the Proposed Action would not substantially damage scenic resources, including but not limited to vegetation and Vaipito Stream, and would not create a new source of light or glare that would affect nighttime views of the project area. Areas of fill and newly constructed channel would remain at or near the pre-existing elevation of the natural channel and would not obstruct views from nearby residences, Pago Pago Elementary School, the Mormon church, businesses, and roads.

TEMCO would be responsible for implementing mitigation measures, including revegetating and contouring finished surfaces to blend with adjacent natural terrain to achieve a natural appearance when the project is complete.

4.11 CUMULATIVE IMPACTS

CEQ defines a cumulative impact as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions..." (40 CFR Part 1508.7). No residential or commercial developments are

expected in the near future in the vicinity of the project area. There is little physical space in the project area to develop.

FEMA is the lead federal agency for conducting the NEPA compliance process for the PDM Program project. It is the lead agency's responsibility to expedite the preparation and review of NEPA documents in a way that is responsive to the needs of Pago Pago Village and American Samoa residents while meeting the spirit and intent of NEPA and complying with all NEPA provisions.

TEMCO and FEMA conducted an informal scoping program at the beginning of the NEPA review process. TEMCO and FEMA met with representatives of the following agencies and organizations for their input on this PDM Program project: ASDOC Planning Division, ASDOC ASCMP, ASEPA, ASHPO, and the American Samoa Department of Marine and Wildlife Resources.

TEMCO and FEMA circulated a Draft EA for a 2-week public comment period. The public was notified of the Draft EA availability via the FEMA web site, direct mailings to known interested parties, and publication of a public notice in the *Samoa News* on October 19 and 21, 2004. During the public comment period, FEMA accepted written comments on the Draft EA addressed to: FEMA Region IX Environmental Officer, 1111 Broadway Street, Suite 1200, Oakland, California 94607. FEMA received no comments on the Draft EA.

The public notice prepared for the NEPA process also serves as the final public notice for FEMA proposing an action affecting the floodplain and wetlands, as required by EOs 11988 and 11990.

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7.1 FEDERAL EMERGENCY MANAGEMENT AGENCY

- Alessandro Amaglio, Region IX Environmental Officer
- Robert McCord, Mitigation Specialist

7.2 URS CORPORATION

- Suzanne Loadholt, Soil Scientist
- Morgan Griffin, Senior Project Manager
- Brian Hatoff, Senior Project Archaeologist
- Chris Barkley, PE, Civil Engineer
- Michael Greene, Senior Project Scientist
- Vicki Hoffman, Environmental Scientist
- Amy Keeley, Senior GIS Specialist
- Manisha Kothari, Environmental Planner
- Lorena Solorzano-Vincent, Biologist
- Steve Leach, Senior Biologist